BRUCE JOYCE AND EMILY CALHOUN

MODELS OF TEACHING

Tenth Edition

FOREWORD BY DAVID HOPKINS AND PASI SAHLBERG

ROUTLEDGE

Models of Teaching

This fully updated edition of a classic text explores established approaches to teaching that are grounded in research and experience to ensure high levels of learning.

Models of Teaching combines rationale and research with real-life examples and applications in the classroom, showing how teachers, professional learning communities, and school faculties can improve student attainment. The volume contains the major psychological and philosophical approaches to teaching and schooling, including thoroughly documented research on the models of teaching and their effects on student success, and offers teachers the tools to accelerate student learning.

Features include:

- three completely new chapters covering the origins of models in teaching, explicit strategy instruction and metacognition for teaching reading comprehension, and best practices for teachers coaching other teachers, expanding instruction, and supporting school renewal;
- scenarios for each model to explore the concepts in action;
- discussions of research relevant to each model throughout the text;
- advice from the authors about the use of the models in teaching;
- support for incorporating the language arts and science standards and supporting STEM instruction.

With the aim of providing a strong impact on student achievement while keeping in line with the current emphasis on standards-based education, this classic resource will be essential reading for pre-service and new teachers as well as current teaching professionals.

This text is supported by extensive multimedia materials, including video demonstrations of the models in action, PowerPoint slides and an Instructor's Manual, available at www.modelsofteaching.org.

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Models of Teaching

Tenth Edition

Bruce Joyce and Emily Calhoun

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Dedication

To those who hold high the candle that brings new light to education as exemplified by the credo of the Bank Street College of Education, written about 100 years ago by Lucy Sprague Mitchell …

What potential in human beings—children, teachers, and ourselves—do we want to develop?

- A zest for living that comes from taking the world with all five senses alert.
- Lively intellectual curiosities that turn the world into an exciting laboratory and keep one ever a learner.
- Flexibility when confronted with change and ability to relinquish patterns that no longer fit the present.
- The courage to work, unafraid and efficiently, in a world of new needs, new problems, and new ideas.
- Gentleness combined with justice in passing judgment on other human beings.
- Sensitivity, not only to the formal rights of the other fellow, but to him as another human being seeking a good life through his own standards.
- A striving to live democratically, in and out of schools, as the best way to advance our concept of democracy.

We fervently hope that the models of teaching we open in this book will live up to her manifesto and keep her candle burning.

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Contents

Foreword by David Hopkins and Pasi Sahlberg xvi
Preface xxvi
Preamble xxix

Part I: Models of Teaching and Communities of Learners

1 The Search for Effective Ways to Educate: Introducing the Models of Teaching 3

2 Creating Communities of Expert Learners: Building on Our Students' Capacity to Learn 17

Part II: Basic Information-Processing Models of Teaching

3 Learning to Learn Inductively: Exploring Data Sets, Building Categories, and Developing Concepts 33

4 Scientific Inquiry: Building Learning around Investigations and Teaching the Culture of Sciencing 63

5 Concept Attainment: The Explicit Teaching of Concepts 85

6 The Picture Word Inductive Model: Developing Literacy through Inquiry 103

Part III: Special Purpose Information-Processing Models

7 Synectics: Teaching the Left Brain to Put the Right Side to Work 133

8 Memorization: Getting the Facts Straight, Now and for the Long Term 155

9 Using Advance Organizers to Design Presentations: From Lectures to Courses, Including Media 175

Part IV: The Social Family of Models of Teaching

10 Partners in Learning: Getting Everybody on Board 189

11 Group Investigation—The Classic Democratic-Process-Inquiry-Driven Model: Beginning with a Puzzlement, a Problem, or a Project 199

12 Role Playing for the Study of Values 211

Part V: The Personal Family of Models

13 Nondirective Teaching: The Learner at the Center 229

14 The Inquiry Training Model: Improving Questioning Skills and Analysis of Evidence 243

Part VI: The Behavioral Family of Models

15 Using Explicit Instruction and Metacognition When Teaching Reading Comprehension 265

16 Mastery Learning: Bit by Bit, Block by Block, We Climb Our Way to Competence 280

17 Direct Instruction: Applied Psychology Goes to Work 287

Part VII: The Conditions of Learning and Educators as Curriculum Developers, Learners, and Leaders of School Renewal

18 The Dynamics of Disequilibrium: Making Discomfort Productive 297

19 The Conditions of Learning: Creating Curricula and Designing Instruction 303

20 Teachers Coaching Teachers: Facilitating Learning and Neutralizing the Discomfort of Change 313

Appendix: Peer Coaching Guides 321
References and Related Sources 375
Index 398

Detailed Contents

Foreword by David Hopkins and Pasi Sahlberg
Preface
Preamble

Part I: Models of Teaching and Communities of Learners

Introducing models of teaching, where they came from, and how they build inquiring communities of learners.

Chapter 1: The Search for Effective Ways to Educate: Introducing the Models of Teaching

We discuss where and when the various models of teaching were invented and briefly introduce them and their purposes. From the time of the academies in Greece and Rome, teachers have generated and shared innovative approaches to learning and teaching. Succeeding generations have given birth to additional ways of helping students learn. As teachers we can draw on these products and use them to help our students become effective and creative learners.

Chapter 2: Creating Communities of Expert Learners: Building on Our Students' Capacity to Learn

Great teaching is made by helping our students become great learners. In various ways our models of teaching bring students into collaborative communities whose members work together and support each other's personal inquiries. We explore elementary, middle, and high school classes as their teachers lead them with a variety of models.

Part II Basic Information-Processing Models of Teaching

How can we and our students best acquire information, organize it, and explain it? Here are several models that are aligned with the Common Core State Standards (CCSS), the Science, Technology, Engineering, Mathematics (STEM) frameworks, and the Next Generation Science Standards—all of which embrace teaching students with the methods of the disciplines underlying them.

As we remind ourselves continuously, a major outcome of these models is the development of capacity to learn, to collect and approach information confidently, and to help one another become a community of learners. The tools learned by finding and managing information support the social, personal, and behavioral families. Information-processing models provide academic substance to social models, ways of thinking for personal inquiry, and goals for many of the behavioral models.

Chapter 3: Learning to Learn Inductively: Exploring Data Sets, Building Categories, and Developing Concepts

Human beings are born to build concepts. The infant, crawling around, feeling things and bumping into them, observing people's actions and listening to them, is born to acquire information that is sifted and organized, building the conceptual structures that guide our lives. The inductive model builds on and enhances the inborn capacity of human beings to organize information about their environments and build and test categories—forming concepts—that make their world more comprehensible and predictable.

Chapter 4: Scientific Inquiry: Building Learning around Investigations and Teaching the Culture of Sciencing

From the time of Aristotle, we have had educators who taught science in the making rather than teaching facts and hoping for the best. Here, we introduce a model of teaching that is science in the making. Today, students can identify a domain of study or problem, conduct investigations of their own, and connect to studies available on the web. Virtual investigations and simulations can shorten time and bring students into labs and field studies where complex equipment is available and faraway settings can be studied. Although in this chapter we give considerable emphasis to the scientific disciplines, including the social sciences, the model applies to all curriculum areas as well as personal inquiries.

Chapter 5: Concept Attainment: The Explicit Teaching of Concepts

Learning concepts is fundamental to all curriculum areas, from phonics to categories of nations and living things and the table of elements. This model is a method for teaching them, how to apply them, and how to build them. Bruce and Fred Lighthall, capitalizing on studies of how people attain concepts and build them, developed variations on this model and its applications to a range of curriculum areas.

Chapter 6: The Picture Word Inductive Model: Developing Literacy through Inquiry

With a nod to the language experience approach to literacy, the picture word inductive model (PWIM) enables beginning readers to develop sight vocabularies, learn to inquire into the structure of words and sentences, and compose sentences and paragraphs. In addition to video demonstrations, www.modelsofteaching.org provides two dozen pictures that can be used to start inquiries. This model is used with younger beginning readers and older struggling readers as part of our Read to Succeed curriculum. PWIM can also be an excellent multi-disciplinary model for learners at a range of literacy levels.

Part III: Special Purpose Information-Processing Models

The models in Part II can be used for some very broad purposes, including designing lessons, units, courses, and distance offerings. The more specialized models in Part III, however, are designed specifically to:

- Learn to use analogies to think divergently
- Learn to memorize more effectively, including facts, concepts, and even the core ideas of philosophies
- Design presentations with advance organizers
- Teach basic inquiry skills

Chapter 7: Synectics: Teaching the Left Brain to Put the Right Side to Work

Creative thought has often been considered as something genetically given to a special few, and something that the rest of us cannot aspire to. Not so. Synectics brings to all students the development of metaphoric thinking—learning to break set to think and solve problems. A serious assist when learning to write. And, synectics is fun! In addition to education, synectics has been used extensively in programs to develop problem-solving ability in a wide variety of organizations.

Chapter 8: Memorization: Getting the Facts Straight, Now and for the Long Term

Memorization has had something of a bad name, mostly because of deadly drills and poorly designed textbooks and lectures. However, contemporary research and innovative teachers have created methods that not only improve our efficiency in memorization, but with processes that are delightful. Importantly, the model stresses that a major key to remembering things is giving them close attention. The demonstrations lead readers through exercises where they learn some things that will stick. Also, when you hear complaints that students forget a lot over vacations, particularly in the summer, but what they lose was lightly learned, the message is to teach *for* retention.

Chapter 9: Using Advance Organizers to Design Presentations: From Lectures to Courses, Including Media

Learning from presentations has had almost as bad a name as learning by memorization. David Ausubel developed a system for creating lectures and other presentations that will increase student cognitive activity and, subsequently, learning. An advance organizer provides a cognitive map of the material, helping students to connect material and retain it. Imagine teaching a curriculum unit and when you open it you provide concepts—ideas—that the students can use to guide their learning as they read, watch videos, and listen. As the unit evolves, you help the student connect those ideas to the content. When reviewing material with them, you again explicitly connect those ideas to the review. Will they learn a little more and retain it a little better? Yes.

Part IV: The Social Family of Models of Teaching

Working together just might enhance all of us. The social family expands what we can do together and generates the creation of democratic relationships in venues large and small. In addition, the creation of learning communities can enhance the learning of all students dramatically. Interestingly, collaboration among people in different settings is remarkably satisfying, as witnessed in the rise of social media. A large (data included from over 30,000 schools) study found that when teachers collaborate in governance of the school, student learning is enlarged (Ingersoll & Collins, 2019).

Chapter 10: Partners in Learning: Getting Everybody on Board

Can two students increase their learning when paired? Yes. Will they develop better social and academic skills if they work together on projects? Yes. Can most students profit from training to collaborate? Yes. Do collaborative classrooms increase productive study and time on task and decrease unproductive and disruptive behavior? Usually. Are cooperative learning models applicable to K-12 and across curriculum areas? Yes. This chapter looks at some of the basic, easy-to-implement forms of cooperative learning.

Chapter 11: Group Investigation—The Classic Democratic-Process-Inquiry-Driven Model: Beginning with a Puzzlement, a Problem, or a Project

Can students organized into a democratic learning community learn to apply scientific methods to their learning? You bet they can. Group investigation can be used to redesign schools; increase personal, social, and academic learning among all students; and satisfy both learners and teachers. Herbert Thelen drew heavily on John Dewey and the post-Sputnik Academic Reform movement to modernize the model which we and others have continued to update and use as a basic professional development and school improvement model.

Chapter 12: Role Playing for the Study of Values

Values provide the center of our behavior, helping us understand ourselves and others. Policy issues involve the understanding of values and the costs and benefits of selecting some solutions rather than others. In these models, values are central. Think for a moment about the issues that face our students right now—research on cells, international peace, the battles against addiction, poverty, and who controls the decisions about pregnancy and abortion, not to mention just getting along together and celebrating our common values and our differences and whether accommodation is desirable.

Part V: The Personal Family of Models

When teachers engage with students, it is to help them learn. One's personality interacts with the learning environment. How do we give the learner centrality when we are trying to get that same person to grow and respond to tasks we believe will enhance growth? And how can electronic connections be shaped so that they are not just a matter of arguing online, but yield reflection and growth? Oddly, some kinds of distance counseling can be quite helpful. Virtual counseling is a developing field. And, by the way, do we learn while we teach? Inevitably.

Chapter 13: Nondirective Teaching: The Learner at the Center

How do we think about ourselves as learners? As people? How can we organize schooling so that the personalities and emotions of students are taken into account? Let us inquire into the person who is the center of the education process. This is a major avenue to personalization and social-emotional learning (SEL).

Nondirective methods can be supported through distance means. During the school years and later, students can be better connected to their teachers and counselors and supported as they reflect on themselves and take steps to build their self-esteem and ability to relate to others. Much of the support that students need when undertaking investigations involving ICT resources, including online courses and other types of distance courses, can be provided in a nondirective fashion.

Chapter 14: The Inquiry Training Model: Improving Questioning Skills and Analysis of Evidence

Suchman's inquiry training model works for teaching basic inquiry skills and for developing students' questioning and analytical skills and their capacity to construct knowledge and modify it based on new information. Its general goal is to help students develop the intellectual discipline and skills necessary to raise questions and search out answers stemming from their curiosity—cognitive habits that will serve them in school and beyond.

Part VI: The Behavioral Family of Models

We enter the world of tasks, performances, and positive and aversive reactions. The study of how behavior is acquired has led to a wide variety of approaches to training. Here we will deal with some of the useful behavioral models.

Chapter 15: Using Explicit Instruction and Metacognition When Teaching Reading Comprehension

For a long time the teaching of comprehension seemed elusive, although reading without much comprehension is not actually reading at all. Then researchers began to study what expert readers do and develop ways to teach students those processes, strategies, and ways of interacting with texts. The resulting model is generally referred to as explicit strategy instruction in reading, cognitive strategy instruction in writing (and mathematics), or structured think-alouds in any discipline.

Chapter 16: Mastery Learning: Bit by Bit, Block by Block, We Climb Our Way to Competence

This is a fundamental training model, where new content and skills are introduced, modeled, practiced, and added to the working repertoire. Planning and assessment are the complex parts of the model, but the investment pays off.

Chapter 17: Direct Instruction: Applied Psychology Goes to Work

Why beat around the bush when you can just deal with things directly? Let's go for it! However, finesse is required, and that is what this chapter is all about. The basic model here is derived from social learning theory. Many distance models—a good deal are of the online variety—are direct, but several need better designs and students need to learn how to use them.

Part VII: The Conditions of Learning and Educators as Curriculum Developers, Learners, and Leaders of School Renewal

In Chapter 18, we continue to study the nature of learning, focusing on how learning new things requires us to make a place for that learning, integrate it with our current concepts and skills, and cope with the inevitable discomfort that even joyful learning produces. In Chapter 19, we discuss the application of Robert Gagné's work to developing curriculum and designing instruction. And in Chapter 20, we introduce our research on how teachers learn new things and how collaborative study—peer coaching—helps ensure that the learning stays around and can be used in the long haul. We apply our research to lay out how teachers can effectively fill the role of coach in a school or school district. Altogether, this chapter provides the design for professional development.

Chapter 18: The Dynamics of Disequilibrium: Making Discomfort Productive

By definition, learning requires knowing, thinking, or doing things we couldn't do before the learning took place. Curricula and teaching need to be shaped to take us where we haven't been. The trick is to develop an optimal mismatch so that we are pushed but not overwhelmed. Vygotsky (1986) popularized the term *zone of proximal development* to refer to content, conceptual understanding, skills, and processes that are just beyond our current development but not so demanding that we get lost. These concepts are very important because content and process that are well within our comfort zone, while soothing, do not challenge us to grow.

Chapter 19: The Conditions of Learning: Creating Curricula and Designing Instruction

Robert Gagné developed a framework that examined learning in terms of degrees of complexity, from responding and learning specifics to building conceptual chains between those items and upwards to problem-solving in a fashion that one can use to design lessons and curricula and choose models of teaching. His groundbreaking work combined research on levels and types of learning with the problem of designing instruction that builds on how we think and build knowledge.

You can use Gagné's ideas to organize a curriculum unit in terms of the types of learning tasks that are required. This is not a model of teaching but a framework that helps you choose the models best suited for what you are teaching.

Chapter 20: Teachers Coaching Teachers: Facilitating Learning and Neutralizing the Discomfort of Change

From the research on how teachers learn, we analyze effective practices where teachers help one another and particularly where they work together to expand their teaching repertoires. Best practices for coaching are laid out, including how to make study groups and professional learning communities effective.

Appendix: Peer Coaching Guides
References and Related Sources
Index

Foreword to the Tenth Edition by David Hopkins and Pasi Sahlberg

The publication of the tenth edition of *Models of Teaching* is a signal moment in the history of educational discourse. Since its first publication in 1972, *Models of Teaching* has led the argument and occupied the moral high ground on the nature of teaching and learning and the creation of powerful learning experiences that enable all our students to reach their potential. In so doing, Bruce Joyce and his co-authors across the years, Marsha Weil and Emily Calhoun, have followed a distinguished tradition of educators that, as we shall see, have spanned a number of millennia. This tradition provides pathways to the creation of learning experiences that not only enhance the individual student's achievement and learning skills but by that token also contribute to the development of society itself.

We are enormously flattered to have been asked to contribute the Foreword to this tenth edition of *Models of Teaching*. But on reflection, despite us being quirky individuals, perhaps it was not such a bizarre invitation. By nationality, one of us is a Welshman and the other a Finn, but the quirkiness is not so much related simply to our place of birth, but to the fact that as educationalists we have deliberately positioned our careers at the intersection of policy, research, and practice. Very few educators have placed their flags in that contentious terrain, and it has not always been easy to maintain such positioning. Yet, as we are committed to both equity and excellence in improving education, we believe fervently that there is no other place to plant ours. The other characteristic that unites us is that we owe a huge debt of gratitude to Bruce Joyce for his mentorship and friendship over the years. It was he who, through his own example, introduced us to this place. We begin this Foreword by saying a little more personally about our interaction with *Models of Teaching* and Bruce Joyce over the years before becoming more descriptive and then analytical about the importance of the publication of this tenth edition.

Before we do, we should make two key points.

The first, as intimated above, is that *Models of Teaching* is not a contemporary flash-in-the pan panacea or the "next big thing" in school improvement. Rather, as is noted

in Chapter 1, *Models of Teaching* has a distinguished heritage. From the time of the academies in Greece and Rome, teachers have generated and shared innovative approaches to learning and teaching. Succeeding generations have given birth to additional ways of helping students learn. In the Preamble, the authors point out the contributions of Comenius, Rousseau, and Locke—all of whom argued strenuously for equity and democracy as well as breadth and individual achievement. Slightly more contemporaneously, the authors refer to the contribution of John Dewey who also had a powerful vision of society and education. We are both committed to Dewey's concept of experiential education and see in *Models of Teaching* tools and scaffolding for achieving such ends. We could go on; the point, however, is that *Models of Teaching* follows a rich tradition of educators and social innovators driven by a vision of individual competence and social development.

The second point that we wish to make at the outset is that *Models of Teaching* is grounded in the solid global evidence base. All the teaching strategies in this book have strong empirical support as to their impact: they are both theoretically rich and demonstrably effective. As our mentor, Bruce was uncompromising in his commitment to empirical rigor and was always challenging us to look at the data and refine our strategies accordingly. We see in the pages that follow the data emanating from a variety of meta-analyses that support the application and utilization of the variety of *Models of Teaching* in a range of contexts. We should also note, parenthetically, the contribution that our friend and colleague John Hattie has made to establishing the empirical base to effective teaching and enabling us to be far more discriminating in differentiating between low- and high-impact approaches. The linking of theory to empirical support is a major strength of *Models of Teaching.* This is one of the reasons why Richard Elmore's salutary warning, which he shared with one of us several years ago, that "teaching is a profession without a practice" is gladly becoming increasingly less true.

So let us say a little more individually about our interaction with *Models of Teaching* and Bruce Joyce over the years.

Models of Teaching and School Improvement

I, David Hopkins, first met Bruce Joyce in San Francisco in the spring of 1979. We met at a US national education conference where Bruce was presenting. At the time I was a graduate student at Simon Fraser University, Vancouver, whose research was being supervised by Michael Fullan (OISE) and Marv Wideen (SFU). We had planned a Summer Institute at SFU for 1980 around the emerging theme of school improvement, and I had been flown down from Vancouver to encourage Bruce to participate. Bruce was characteristically generous in embracing my naivety and agreed to participate. The subsequent six-week Institute on the iconic SFU Burnaby Mountain campus had recruited other global leading educational thinkers and activists. We all taught a course in the Summer School, engaged in twice-weekly seminars with each other over dinner, and made a keynote presentation at the Institute. We subsequently published the keynotes as chapters in *Alternative Perspectives on School Improvement* (Hopkins and Wideen, 1984).

During that six-week period we became our own professional learning community, well before that term became popular. We were excited and stimulated by each other's research and insights but were also motivated by the awareness that we were

laying the intellectual basis for what was becoming the emerging field of school improvement. The year before the Institute, Michael Rutter and his colleagues published their landmark book *Fifteen Thousand Hours* (Rutter et al., 1979). It was this book that laid the basis of the effective schools movement that generated increasingly sophisticated descriptions of the characteristics of those schools that made a significant difference to the progress of their students, irrespective of socioeconomic background. We were galvanized by the thought that we were contributing to a parallel movement. This was becoming known as "school improvement," and its proponents were generating a methodology and developing strategies that enable schools to become increasingly effective.

Bruce Joyce's contributions to our discussions that summer were seminal. His charisma and personal leadership were pervasive, and he was so much fun to be around. More than that, however, he exerted an intellectual discipline on the group that was both challenging and liberating. For example, he helped me understand that moral purpose and strategic action are the opposite sides of the same coin. If we are to create powerful learning experiences for our students—experiences that are sustained and impact on both equity and excellence—we need to keep the goals of education in mind whilst at the same time creating increasingly specific strategies for both pedagogy and professional development that will enable the achievement of those goals. The word *specific* is important here because it implies precision rather than didacticism. For as another contributor to the Institute, Lawrence Stenhouse, commented in one of our seminars, "Specific, yes; prescriptive, no." It was Bruce's focus on a range of specific pedagogies that promote learning, together with his articulation of peer-coaching strategies for professional development, that provided the essential infrastructure for the emerging field of school improvement.

We would like to think that our sojourn on Burnaby Mountain that summer of 1980 was influential not just for the participants in the Institute and the students on the courses we ran, but more widely in helping to shape the development of the school improvement movement. This was particularly the case in terms of Bruce's emphasis on models of teaching and peer coaching. Certainly, our collective presentations and publications influenced the OECD's International School Improvement Project (Hopkins, 1987) and the subsequent Improving School Leadership project (Pont et al., 2008). As the global interest in school improvement as the strategy for achieving both equity and excellence has burgeoned, Bruce's influence through the twin emphasis on models of teaching and professional development has been transformational.

Since those early beginnings, Bruce and I have remained close professional colleagues and friends. He has contributed to numerous conferences and consultancies over the years, and he has been enormously supportive in terms of the design, contribution of materials and provision of training for our school improvement programs, particularly Improving the Quality of Education for All (IQEA) and Curiosity and Powerful Learning. Space precludes more detail here, but one vignette is illustrative.

In 1997, when I was Dean of Education at the University of Nottingham, Bruce and Emily visited us to provide professional development for my faculty staff and the school improvement groups in our IQEA network. As part of the professional and social interactions, Bruce and Emily met the headteacher of Hempshill Hall Primary School which my two youngest children, Jessica and Dylan, attended. The conversation led to a visit and eventually to Emily demonstrating the picture word inductive model (see Chapter 6) to staff through teaching a series of classes of which Jessica was a member. I still remember Emily's calm and precise language, her warm positive

interaction with the children and the strategic scaffolding she brought to the series of lessons. Subsequently, we wrote up the visit for *Educational Leadership* (Joyce, Calhoun, Puckey, & Hopkins, 1997) and included a more extended case study in *The New Structure of School Improvement* (Joyce, Calhoun, & Hopkins, 1999). The point is that *Models of Teaching* is no arcane, research-based, add-on to a school's provision, but is rather the lived reality of how we achieve both equity and excellence through precise, concerted professional action. We concluded the chapter on Hempshill Hall (Joyce, Calhoun, & Hopkins, 1999, p. 147) in this way:

> Hempshill Hall refines aspects of its operation on a continual basis. How? By doing it. The Head has convinced the teachers and parents that school improvement is part of teaching and parenting and has created a climate that matches the vision. A healthy climate for adults becomes a healthy place for children. The mode of continual search for improvement rubs off on the children.
>
> The inquiry continues …

And so it does. Despite the passage of time, Bruce, Emily, and I regularly continue our now close to half-century-long conversation about school improvement.

So that is a précis of the Welshman's story. Let us now turn to an account of the impact of *Models of Teaching* in Finland.

Models of Teaching Arrives in Finland

I, Pasi Sahlberg, first heard about Bruce Joyce in 1984 when I had just started my educational journey towards a doctorate degree at the University of Helsinki. That was the time before the internet and ebooks, when the best way to read a textbook was to line up in the university library and have a hard copy of a book for a week or two. Mine was the second edition (1980) of *Models of Teaching* that had clearly been read by many students before me.

The book was made required reading for anyone who intended to complete advanced studies in educational sciences at that time. In the late 1980s when I was working on my teaching diploma and further academic studies in education, Finland had experimented with research-based primary and secondary teacher education for a decade. Students aiming to teach in Finnish K-12 schools needed to hold a master's degree. *Models of Teaching* was a foundational part of pedagogical literature in most primary teacher education curricula. The philosophy of the power of a diverse repertoire of teaching methods as the bedrock of the teaching profession sat perfectly in the long pedagogical tradition in Finland ranging from Uno Cygnaeus in the nineteenth century to Mikael Soininen and Matti Koskenniemi during the twentieth century.

Models of Teaching arrived in Finland at the right time. The new comprehensive school that replaced the parallel two-pathway nine-year compulsory school system in 1972 was built on ideas of integration and inclusion that brought all Finnish children to be educated in one type of school instead of sorting them based on their, or their parents', academic orientations and aspirations. This required, first and foremost, that teachers were able to craft their teaching according to a much more diverse range of learners than before. Initial teacher education was recalibrated accordingly. All teachers, including those teaching in primary schools, had to have advanced studies in education that often meant expanding their pedagogical knowledge and practical skills. Teachers were expected to design and choose their teaching methods according

to curricula goals and students' needs. *Models of Teaching* became an answer to these expectations.

I spent the second half of the 1980s as a teacher in a teacher training school run by the University of Helsinki. *Models of Teaching* became my most important reference when supervising new science and mathematics teachers who did their practical training in my school. My colleagues and I were particularly interested in how different teaching methods in that book could serve improving student outcomes in science and mathematics. This gave us an idea to translate some of the most promising and suitable models into Finnish so that all teachers could use them in improving their teaching. Inductive thinking, concept attainment, inquiry training, group investigation, synectics, direct instruction, and nondirective teaching were among those that hundreds of Finnish schools and thousands of teachers experimented with in their classrooms and often adopted as part of their pedagogical practice repertoires.

The core part of the Finnish way of *Models of Teaching* was an intensive development of teaching methods that would fit in the philosophy of the new comprehensive school and that would support the emerging culture of teacher professionalism in schools. Two books that included detailed descriptions of 15 teaching methods and tested examples from Finnish classrooms were published in 1988 and 1989. A final single-volume updated edition of these teaching methods appeared in 1990 and became a high-demand pedagogical manual across the country (Sahlberg, 1990). The National School Improvement Network that was facilitated by the National Board of (General) Education was an innovation that had an impact on how teachers taught and especially how they thought about knowledge, learning, and teaching.

Since the creation of the new comprehensive school in 1972, Finland made big investments in teacher and leadership development. Part of that was traditional whole-school training days about the national reform, including curriculum, pedagogical development, special education, and so on. An important part of teachers' and school leaders' professional learning happened in the national educational training center in the small town of Heinola, 90 minutes north of Helsinki. Thousands of teachers every year gathered there for week-long courses planned and facilitated by the NBE staff. One of the key policy priorities in these courses was developing teachers' knowledge and skills in diverse teaching methods that were needed to succeed with the ongoing national school reform. This is where Bruce Joyce comes in.

In 1989 my colleagues and I invited Bruce to speak about *Models of Teaching* to the group of teacher educators and regional lead teachers in Heinola Training Centre. Bruce generously accepted our invitation just like he did David's a decade earlier. But rather than just speak about the teaching methods, he offered to run a week-long masterclass on what effective teaching methods look like in practice and how teachers best learn to use them in school. This was a game-changing opportunity for all of us. We learned about these teaching methods by acquiring these same methods under guidance from Bruce. We explored the inquiry training method using inquiry training; we learned about synectics through synectics; and we practiced group investigation through cooperative learning methods. By the end of the week, we were not just filled with a deeper understanding of a wide range of teaching methods, but we had learned about necessary conditions to design effective professional learning for other teachers on models of teaching. Bruce left his mark on the science and art of pedagogy that influenced the evolving new era of schooling in Finland in the 1990s.

Without a doubt, *Models of Teaching* had a significant positive impact on the direction of educational policy and practice in Finland after Bruce's visit. It certainly

changed the way we understood teaching and what is needed to expand teachers' active teaching repertoires. I soon took these lessons with me to the next chapter of my career. In 1991, I was offered a position as a senior advisor in science education in the newly established national education authority called the National Board of Education (NBE). I continued to support the ongoing experimentation and pedagogical innovation in teaching methods in Finnish schools. Two years later I moved to establish and lead the Teaching Methods Unit in the NBE. This unit provided support to schools in their work on models of teaching and researched different aspects of change in schools. That continued until the end of the 1990s.

In my doctoral research project that I designed soon after meeting with Bruce, I investigated the effectiveness of peer coaching in the Finnish context. Just like Bruce had described in *Models of Teaching* and his other works, we realized that changing the way teachers learn to use different teaching methods effectively in their classrooms requires more than listening to lectures and practicing new skills in workshops. A few years earlier, Bruce had demonstrated in Heinola that the transfer of new skills from staff development to practice must also include opportunities to practice new skills in safe environments, receive feedback from experts and colleagues, and have opportunities to rehearse these new teaching methods in their own classrooms with trusted colleagues. "Researchers, teacher-educators, and policymakers decided to adopt peer coaching as a fundamental principle for the new teacher education and school improvement program nationwide," as I wrote in *FinnishEd Leadership* (Sahlberg, 2018, p. 11). Bruce left a permanent mark on Finland's educational culture by showing Finnish teacher-educators that teachers learn from one another while planning their teaching, developing curriculum, co-teaching shared classes, and exploring together the impact on their students' learning. Most Finnish education reforms during the 1990s were built on these foundational principles of teacher collaboration and professionalism.

The intriguing question is: What is the role of *Models of Teaching* in the Finnish educational saga that became well known since the launch of the OECD's Programme for International Student Assessment (PISA) in 2000. Finnish 15-year-olds' achievement was on top among the OECD countries—against all expectations in Finland. It was, and still is, difficult to explain the unexpectedly high performance of Finnish students compared to other countries (Sahlberg, 2021). One common theory has been that research-based teacher education has equipped Finnish primary schools with professionals who have advanced capabilities to think about teaching and combine theory and praxis to benefit different learners in their schools. I have argued that it is exactly this fertile professional and pedagogical foundation that gave roots to the *Models of Teaching*—and learning—to grow in Finnish schools. The verdict? I am confident to conclude that earlier editions of this book you are reading have made Finnish teachers better by expanding their understanding of learning and improving their repertoires of teaching methods.

Having reflected on our personal histories with Bruce Joyce and *Models of Teaching*, it is important that we now say something further about the concept of a model of teaching and the book itself.

Models of Teaching—an Overview

In *Models of Learning Tools for Teaching*, we (Joyce, Calhoun, & Hopkins, 2009) wrote that: "Learning experiences are composed of content, process and social climate. As learners we

create for and with our children opportunities to explore and build important areas of knowledge, develop powerful tools for learning, and live in humanizing social conditions" (p. 7). Not only is this a pithy description of what Richard Elmore (City et al., 2009) has called the "instructional core," it also identifies the crucial characteristic of a model of teaching, in that it is also a model of learning. Skilled teachers seek to integrate curriculum content, teaching and learning strategies, and school culture. When they do, the effect is to lift their students' academic achievement and simultaneously extend their learning capability. When teachers add a range of teaching models to their professional repertoire, they then have the skills to enable their students to learn how to learn at the same time as acquiring curriculum content.

How we teach has a large impact on our students' abilities to educate themselves. Each model of teaching has a core purpose that relates how to organize teaching with ways of learning. So, for example:

- *Cooperative group work strategies* quicken and deepen learning experiences and generate meta-cognitive moments. At the same time students also learn how to discuss, coach each other, and develop social skills.
- *Inductive teaching* moves from the presentation of data to having students sort and classify data and to think deeply about collecting and sifting information. Working in this way not only helps students generate hypotheses but also to think in a logical way.
- *The synectics teaching model* assists students in generating creative solutions to problems and in so doing develops their creative capacity across the curriculum.
- *Direct instruction* is the most ubiquitous teaching model, widely referred to as whole-class teaching. It has significant positive impact on student achievement and can also enhance the student's ability to extract information and concepts from lectures and presentations.

In this tenth edition of *Models of Teaching*, Joyce and Calhoun identify and describe close to two dozen different models of teaching that have a variety of both precise pedagogic (for the teacher) and learning effects (for the student). The authors divide this collection of models into four different families that each reflect a distinct learning focus:

Basic information-processing models of teaching: The models in this family assist students to acquire information, organize it, and explain it. For teachers, these models have a broad range of pedagogic purposes, including designing lessons, units, courses, and distance offerings. They also fit well and can deliver across a range of national and local curriculum frameworks as well as teaching students the methods of the disciplines underlying them. These models include the inductive, scientific inquiry, concept attainment, and the picture word inductive model.

Special purpose information-processing models: The more specialized models are designed specifically to assist students to use analogies to think divergently (synectics), to learn how to memorize more effectively (mnemonics), and design presentations (advance organizer).

The social family of models of teaching: Working together can enhance the learning of students dramatically. The social family expands what students can do together and

generates the creation of democratic relationships in venues large and small. These models include partners in learning, group investigation, and role playing.

The personal family of models: When teachers engage with students, it is to help them learn. The challenge is how to give the learner centrality whilst trying to get them to grow and respond to tasks that will enhance growth. It is here that the non-directive and inquiry training models play a vital role.

The behavioral family of models: The study of how behavior is acquired has led to a wide variety of approaches to training and learning. In this section the authors describe some of the most useful behavioral models, such as explicit instruction and meta-cognition when teaching reading comprehension, mastery learning, and direct instruction itself.

In the final section—"The Conditions of Learning and Educators as Curriculum Developers, Learners, and Leaders of School Renewal"—the authors focus on the school-level architecture necessary to support the adoption of models of teaching. They first focus "on how learning new things requires us to make a place for that learning, integrate it with our current concepts and skills, and cope with the inevitable discomfort that even joyful learning produces." They also discuss the application of Robert Gagné's work to developing curriculum and designing instruction. And finally, they reprise their seminal work on how teachers learn new models and how collaborative study and peer coaching help ensure that this learning is embedded and can be used in the long haul.

These sections and chapters, although theoretically grounded and empirically evidenced, are no dry research summaries. Each model has its own distinctive pedagogy described in a series of phases, or *syntax* to use the authors' word, that are laid out clearly in a succinct and operational way. The Appendix includes a sample of peer-coaching guides that complement the models and serve as professional development tools that can be used in a formative professional relationship to aid implementation and refine skill development for teachers and students. These are essentially professional development tools that enable teachers, in collaboration, to learn about and add individual models to their burgeoning professional repertoires.

Models of Teaching for Equity

Teaching to the success for all is not easy. Teaching is difficult because students are different. They have different interests; their life circumstances are not the same; and their brains are wired differently to process information and make meanings of the world around them. Around the world, schools have become more diverse compared to what they used to be in the twentieth century. And yet, the overall goals of education are often built around achieving both excellence and equity simultaneously.

Until the end of the 2000s, quality of educational outcomes remained the primary, and often the only, goal that schools and education systems pursued. Since then, as the OECD (2019) and other international agencies have noted, equity of learning outcomes has become an integral element of great schools and high-performing education systems. In plain terms, equity in education is about *fairness*—that means that personal or social circumstances such as gender, ethnic origin, or family background are not obstacles to achieving educational potential—and *inclusion* that ensures that all

children in school reach at least a basic minimum level of education. More equitable education means that differences in student achievement in school are not the result of differences in family's wealth, income, power, or possessions—in other words, home background.

Teaching methods in this book have been tested and researched in a wide range of educational settings. Since these methods lead to different kinds of learning processes, their impacts on students' cognitive, social, and behavioral outcomes also vary depending on the context in which they are used. The chapters of this book make it evident that when used appropriately and according to their initial design, these models of teaching can significantly ensure student achievement. An intriguing question is: how do these teaching methods serve the growing need of making teaching in schools improve learning of all students?

Equity of education outcomes is fundamentally about crafting teaching to meet the needs of different learners in the classroom. Our own lived experiences in schools, just like those of other teachers, confirm that teaching methods that suit one student don't necessarily work for other students. The art and science of good teaching is about knowledge and skills to use different teaching methods in harmony to offer all students better opportunities to achieve their learning goals. Different models of teaching, when used purposefully, can enhance students' models of learning that allow them to understand and better regulate their own learning.

Achieving better equity in education requires much more than different pedagogy or powerful teaching. Research has made it clear that out-of-school factors account for about 60 percent of the variance in student-measured achievement in school while the influence of teachers and other in-school factors is responsible for about 40 percent of the variance. We also know that teachers are the most important in-school element influencing student achievement, and that schools' resources and instructional support can make a big difference in the equity of these outcomes. Diversity of teaching methods used in school can make an additional boost to the achievement of different learners.

A Final Word

We have just mentioned the phrase "the art and science of good teaching." A brief reprise on this theme and the role that *Models of Teaching* plays in achieving this union is probably a good place to conclude this Foreword. One of the enduring myths in education is that teaching is either an art or a science. Our response is that it is neither one, nor the other—it is both. And *Models of Teaching*, as we have been arguing, enables teachers to do just that.

Let us put it simply:

- *Teaching is a science* in so far as there are strategies and practices that a body of research has shown to be effective in enhancing learning. Just like doctors and other professionals, teachers should use research to inform and understand their practice. *Models of Teaching* provides such a rich set of evidence-based protocols.
- *Teaching is an art* in so far as teachers must bring themselves fully into their teaching—their values, passion, and *joie de vivre*. But they must also expand their personal repertoire of practices so that through a process of reflection they discover how to construct the most powerful learning experiences for their students. *Models of Teaching* are

specifications, not prescriptions, that teachers can internalize into their repertoires to enhance their personal professional practice.

- *Teaching is an art and a science* when teachers are first (*science*) continually observing their students in order to see how they learn best; and then (*art*) using their collective professional judgment—akin to surgeons operating on a patient or actors performing in a play—to adapt their teaching practice(s) to fit the learning needs of their students. *Models of Teaching* not only provide teachers with guides of how to do this, but through using the peer-coaching guides establish professional learning communities in the school to enhance collective practice.

This is the power of *Models of Teaching*, and we commend this tenth edition to you warmly. There is much wisdom, inspiration, and joy in the pages that follow. By using these models of teaching judiciously, as we saw in the quote from earlier, you will have tools for creating with your students opportunities to explore and build important areas of knowledge, develop powerful tools for learning, and live in humanizing social conditions.

This is the essence of achieving equity through excellence and *Models of Teaching* helps us make that aspiration possible.

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Preface

Models of Teaching connects educators and policymakers to a supply of well-developed and studied ways of teaching. These models have strong rationales, have generated lines of research and evaluation, and provide examples of the kinds of student learning we can expect from them. All of them are informed by the experience of the hundreds of educators who have used and refined them. Thus, the models represent a base for professional teaching—professional meaning "using research and grounded experience to guide practice."

Years ago many educators expected that research on teaching would result in a single model that was superior for all types of educational objectives and person-related differences among students or at least a set of teaching skills that work for most students and most objectives. However, that was not the case when we began writing *Models of Teaching*, and it is not the case today. Excellent teaching is made up of a repertoire of skills that are very good for particular purposes but need to be assembled to generate an optimum learning environment for all our students. In other words, good teaching has not been a one-dimensional operation.

The pandemic years dramatized the strength of teachers, parents, and students, all of whom made distance-based teaching and learning work remarkably well. In spite of negative claims from many publicized nay-sayers, the results from the National Assessment of Educational Progress indicated that "test scores" were remarkably similar between 2020 and 2023. Students, teachers, and parents turned out to increase energy and skill where they had to and flexing when they needed to. Zoom and Skype made the virtual a present reality and made peer coaching out of strangers, while Infinite Campus and similar networks brought parents/caregivers and teachers closer together.

Even today some policymakers hope that research will reduce the characteristics of effective teaching into a few principles or a prescribed science of teaching. There are, in fact, some things that we all should do as teachers, and other things we should avoid, but it's an application of knowledge and continuous learning about what works and about our students, rather than a few principles, that make us effective.

Helping students learn is what we aspire to do. And interactive teaching is not the only tool we have. All students need a high-quality laptop or tablet. Should a school be a digital hot spot for its neighborhood? You bet it should! Information and

communications technology (ICT) flattens out the distance-caused problems of communication in rural areas and eases person-to-person communication in inner cities. Some 20 years ago, we worked with the Northern Lights School District in Alberta, Canada. The district covers a little over 5700 square miles (14,800 km) and spans 124 miles (200 km). In about the middle of the district was a tower designed to make digital communication available to all the schools in the district. We knew affluent suburban schools that were less connected to each other.

For the energetic and ICT-savvy, a wide range of curricular resources are now commonplace. You can watch international meetings on your screen and order physical books from libraries near and far. Speaking of which, every classroom in every school needs to surround its students with several hundred physical books, fiction and nonfiction. This classroom immersion in books provides access to quality text to read, mentor texts for use when composing, and disciplinary texts for expanding knowledge. Electronic media gives access to vast resources that represent a real advance over available on-site print media. The web connects modern classrooms and students to global networks. The study of history can be supported by original documents that are easy to access, including graphic material such as the 1,000,000 photos in the Library of Congress collection (www.loc.gov).

Digital technology enables any class to be connected with classes in many of the countries of the world, enhancing the study of geography, global connections, geopolitics. NASA provides information about space exploration that was available to only insiders a dozen years ago. The Citizen Science projects from https://scistarter.org/ and CitSci.org to others listed in https://www.citizenscience.gov/# allow students to participate in hands-on science activities as they investigate questions, gather and analyze data, and communicate within a collective inquiry community. And https://www.sciencefriday.com/ is a delightful site for students and teachers, with simulations available to incorporate into units and courses. Young children can follow Jane Goodall's career from her earliest studies to the development of the worldwide organization of children and adults who work together to create a better environment for all living things (including ourselves).

In our case, we have come from writing manuscript on yellow tablets and typing the result with bottles of corrective fluid on hand. From there, the process evolved to writing and communicating with editors with word processors and graphics files. And at present, more of you will experience *Models of Teaching* as an ebook rather than a paper book. With both formats backed up by www.modelsofteaching.org, which brings materials for instructors and students and leads readers to video demonstrations of models, talks providing tips for learning them, PowerPoint tutorials, and more. We don't just write today, we relearn how to write.

The current science and social studies frameworks and literacy and mathematics standards are greatly improved over their predecessors and provide direction for K-12 teaching and learning (www.nextgenscience.org, https://www.socialstudies.org/standards/c3, https://thecorestandards.org). Thus, developed models of teaching can become even more effective because support materials, both print and electronic, have become richer.

Our cause is passionate. Education is not only present life; it is also the life of the future. As time passes, all of these models of teaching will be radically changed or replaced by better ones. For now, let us give students the best that we know. Or to put it another way: All the models in this book work with students from every socioeconomic status (SES) and ethnic background!

What students learn today affects their lives in the long term. When we teach our children to read, we are helping them become lifelong readers. When they are learning to work together, they are becoming collaborative citizens of our democracy. When they learn science, they are developing the inquiry skills and habits to educate themselves and solve current and future problems.

Teaching is helping people create themselves. The effects of a teacher's work are still multiplying a half-century or more after students' formal education is completed.

Preamble

Literacy and Democracy Generated Educational Research and Development

The Greco-Roman culture furthered literacy and influenced Europe, where, in parallel cultural cadences, languages and countries were being created whose cultural variations and migrating citizens were important as the New World was populated. The ideas of universal literacy and full participatory democracy formed and actualizing them was uneven, but the idea stayed alive.

Highly educated spokespeople appeared, even in autocratic societies. Consider these three leaders who spoke strongly about universal education. All of them had read the Romans, the Greeks, and religious philosophers like Thomas Aquinas, and could build on their ideas.

- John Amos Comenius (1592–1670) was a Czech religious and educational leader who advocated universal education to provide high qualities of living for individuals and collective knowledge for the improvement of society.
- Jean-Jacques Rousseau (1712–1778) was a French philosopher who also advocated an education to enable all citizens to reach their potential and build a strong base for social improvement. His book *Emile* feels remarkably relevant today.
- John Locke (1632–1704) represents British scholars who advocated universal literacy. A scientist and political activist, he strongly believed that democratic, rather than authoritarian, processes should make up the social contract and that education for all would underpin democratic behavior and institutions.

Colonial America

The first English colonists in America included among them men and women who could read and write and that fact greatly influenced the society that they developed.

The history of schooling in the United States begins with those first settlers. The documents that founded Plymouth in 1620 contained a compact that promised participatory governance. Soon afterward, William Bradford, who was the elected governor

for 30 years, produced written documents that outlined democratic processes and promised literacy as an obligation of the community. Just 15 years later, the first schoolhouse, called the Latin Grammar School, later renamed the Boston Latin School, was built in 1635 as a preparatory school for boys *from all socioeconomic classes*.

Now, where would the graduates of a preparatory school go to college? Well, Harvard College was founded in 1636, providing an answer and right in town. An inscription beside the Johnston Gate that leads to the grounds of Harvard captures the poignant awareness of the colonists about the generations to come, even as they were creating their first towns and institutions.

> After God had carried us safe to New England/and wee had builded our houses/ provided necessaries for our liveli hood/reard convenient places for Gods worship/and setled the civill government/one of the next things we longed for/ and looked after was to advance learning/and perpetuate it to posterity/dreading to leave an illiterate minister/to the churches when our present ministers/shall lie in the dust.

Note that both the Latin Grammar School and Harvard College provided formal education to males. Schooling for women was much slower to develop. A striking example is that it was 1879 before Radcliffe College was established for women on a "co-institutional basis" with Harvard. In 1999 a complete integration with Harvard was managed. Ironically, as this is written, in American public colleges today, three-fifths of the students are females.

The American Revolution and the Early Republic

In the United States, a number of strong voices addressed education during the period that led up to independence and the ratifying of the Constitution. Prominent in them were Benjamin Franklin and Thomas Jefferson whose talks and writings generated discussions that continue today. They both believed that education should be universal and was an essential condition of democracy. (Jefferson developed a framework where progression through the levels of education would be attained by success at each level.) Both argued that issues should be resolved by reasoned argument and empirical inquiry rather than superstition, tradition, or rhetoric. Processes like that would depend on an educated citizenry.

Oddly, however, the Constitution did not mention education, and the states became responsible for establishing it. The colonial states differed widely in their readiness for this task. Some had made considerable strides by the time of independence. By 1765, there were 25 newspapers in the 13 colonies (https://www.britannica.com/topic/American-colonies/Imperial-organization). Boston, alone, had five newspapers by 1770, including the influential *Boston Gazette*, which was founded in 1719 (https://www.loc.gov/rr/news/circulars/bostongazette.txt). Literacy was obviously well-established, despite slowness in providing education for girls.

And, while declaring that "all men are created equal," the Declaration of Independence gave only an indeterminate place to women and none to slaves. Note that not until 1920 were women granted the right to vote. *And in 2023, in the United States, provisions to ensure that all racial and ethnic groups have equal access to the ballot in all places in the country are still needed. And reproductive freedoms are still debated.*

For education, the battle to provide quality education for all has been confounded by the effects of socioeconomic status. Family and community resources continue to have a very large effect on both access to and the results of schooling. The models of teaching in this book reach everyone.

Modern Empirical Educational Research: Building and Testing Models of Curriculum and Instruction

John Dewey and Progressive Education: The First Major Reform Movement and the Beginning of Educational Research

John Dewey (1859–1952) had a powerful vision of society and education. He regarded students as citizens-in-the-making and believed that educational processes should be based on the needs and responsibilities of citizens in a democracy as individuals and collectively. Students would be organized into collaborative groups that would be taught to use scientific inquiry and disciplined discourse as basic tools for learning. Tracing ideas from Franklin and Jefferson to Dewey shows a direct translation from ideas in the Constitution to the shaping of education at the dawn of the twentieth century.

By the early 1900s, a major movement developed as Progressives—political advocates for social improvement—turned their attention to education. Two ideas were central: *One is that preparation for life in a democracy should be conducted with the cooperative, collaborative processes that are the core of democratic life. The other is to conduct education with the best tools we have for testing ideas—the methods of scientific inquiry. Thus, cooperative inquiry becomes the method of education.*

As educational research began to develop during the first half of the 1900s, efforts were made to compare Progressive schools with tradition-conserving schools in districts that did not use cooperative-inquiry modes of teaching. A beautifully constructed research study compared students from 30 Progressive secondary schools with students from 30 proudly "traditional" schools through the high school years and college, dealing with the often-asked question of whether cooperative-inquiry methods would stand up academically. And they did! The students from the Progressive schools did well academically and were more actively involved in civic affairs on and off campus (see Chamberlin and Chamberlin, 1943).

World War II Increases Research and Development in Education

During the 1940s an increasing number of researchers, impelled by the needs of the military, was funded to study leadership, integrativeness in groups and organizations (think crews of bombers, warships, and infantry platoons) and various models of training. Those scholars emerged from the war years with well-developed lines of inquiry that were applied in civilian institutions. The psychological needs of returning servicemen gave rise to advances in therapy and self-help protocols. Thus a much larger community of psychologists, social psychologists, and therapists came into existence. Research on training and interpersonal relations laid the base for models of teaching that are used to this day (see Lumsdaine and Glaser, 1960). The National Training Laboratories for Group Development, soon referred to simply as NTL, was founded in 1946–1947, and generated and expanded ways of developing interpersonal

health for individuals and healthy and effective group and organizational development. Simultaneously, the bases for training and group development models of teaching were being laid.

The Post-Sputnik Burst of Energy

Through the first half of the twentieth century, most Americans believed that the United States possessed the best educational system in the world. Many Europeans disputed this. Americans disagreed, saying that if European achievement was higher, it was largely because their systems were selective, favoring high-achieving students, while the American policy of educating *everyone* reduced measured quality to a "lowest common denominator" level.

The discussion about educational quality was abruptly accelerated in 1957 when USSR scientists succeeded in putting a small satellite into orbit around the Earth, and it emitted a "mechanical beep" sound as it traveled. The sound of Sputnik caused an incredible uproar in the United States. Fueled by politicians and the media, a virtual hysteria occurred. Many wondered if we had been kidding ourselves that our education was, really, the best in the world.

A picture of the satellite appears below. (https://www.nasaspaceflight.com/wp-content/uploads/2015/10/2015-10-04-172511-350x242.jpg)

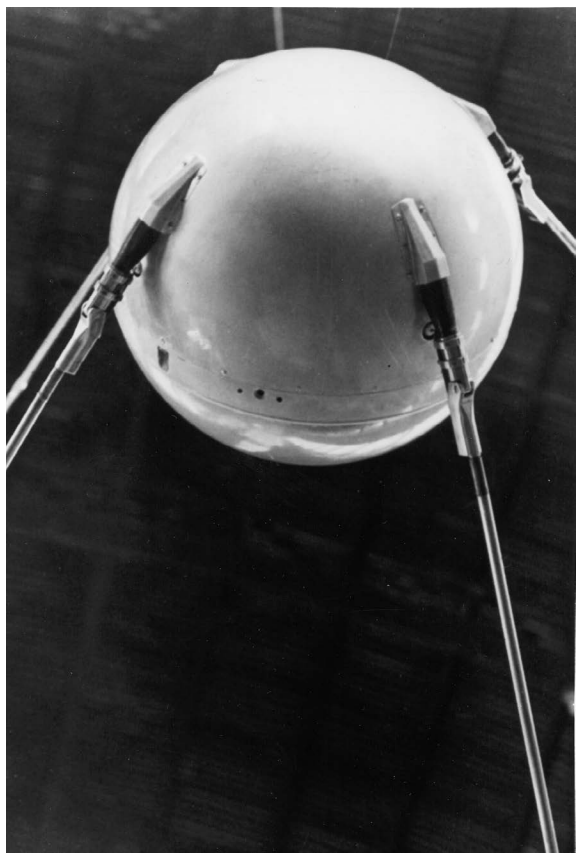

FIGURE 0.1 Sputnik

The response by the United States was to direct resources into scientific and engineering endeavors (Mazuzan, 1994). In 1958, the National Aeronautics and Space Administration (NASA) was established and funds for scientific research increased dramatically. The Department of Defense received considerable resources to apply science to the development of new technologies. Similarly, funding for the National Science Foundation (NSF), which had been established in 1950 for research and development and dissemination of scientific knowledge, was increased substantially.

Education also received serious attention (Hunt, 2023). The United States government came, very quickly, to believe that the Soviet educational system had exceeded ours, ultimately leading to better scientists (and other professions). President Eisenhower and Congress sought ways to strengthen the U.S. education system at all levels—elementary, secondary, and postsecondary institutions. Thus, in 1958, the National Defense Education Act (NDEA) was approved by Congress. NDEA was a major educational reform act, signaling large-scale involvement by the federal government in school improvement.

The Academic Reform Movements: 1955 to the Present

The National Defense Education Act (NDEA) enabled the federal government to become active in education. Because educating citizens was the responsibility of the states, direct action from the federal level, including funding, did not happen until this time (with the exception of the "Land Grant" legislation in the 1860s). But the reaction to Sputnik was to direct federal monies toward educational development. The National Science Foundation, together with private philanthropies such as the Ford and Carnegie Foundations, generated a major reform movement. In addition to the development of curricular and instructional models, the movement generated considerable amounts of research and evaluation, enabling us to estimate the effects of newly developed content and process when they are used in schools and classrooms.

Because a considerable amount of research on teaching and curriculum was connected to the academic disciplines, particularly the biological, physical, and social sciences, the effect was to bring scientific concepts and processes into education in three phases or waves of energy. The first phase took place from the late 1950s until about 1985. The second phase occurred between 1985 and 2008 and built on the first movement. We are in the third phase now, as the National Research Council (2012)—comprising members from the National Academy of Sciences, the National Academy of Engineering, and the National Academy of Medicine—has published its framework for K-12 science standards (2012, http://nap.nationalacademies.org/13165) and its update on implementation, *Taking Stock of Science Standards Implementation: Planning for Progress* (2022, https://doi.org/10.17226/26549).

Conducting Research on the Models of Teaching Generated by the Academic Reform Movements

Studies of Curriculums at the Secondary Level in Mathematics and Science

A set of meta-analyses of more than 300 studies on science curriculum and teaching was coordinated at the University of Colorado (Anderson, Kahl, Glass, Smith, & Malone, 1982). Taking into account that the research on science teaching is complex and studies vary considerably in their objectives and conduct, a persistent focus was on

the effect of efforts that are characterized within cooperative/inductive inquiry. Particularly, did students acquire information, build and study data sets, form concepts by organizing and analyzing information in those sets, and engage in investigations (formulate questions, devise methods, and study results)? Put another way, did the students learn academic content and processes for solving problems by studying science content with empirical methods and engaging with the inductive processes that cross curriculum areas?

Ronald D. Anderson (1983), a senior researcher at the Laboratory for Research in Science and Mathematics Education at the University of Colorado in Boulder, summarizes concisely the results of the sets of studies: "Pertinent information from four of the meta-analyses is discussed here and, in general, points to a positive vote for inquiry teaching" (p. 500). Anderson, however, was concerned about the extent that inquiry methods are actually implemented in long-term curricular implementations. He points out that in the Shymansky, Kyle, and Alport (1983) meta-analysis of 105 studies (1000 classrooms with, conservatively, 150,000 students), degrees of use of inquiry methods did not generate differences in effects. However, even in the control groups, *all* of the curricula studied were based on science content and processes, and most of the studies were of six months or more, so differences of degree may not be large.

Studies at the Elementary Level

In addition to the set of University of Colorado studies, Bredderman (1983) pulled together the studies of the inquiry-oriented, hands-on science curriculum at the elementary level.

Bredderman drew on research on three "activity-based" programs funded through federal resources and assembled by scholars in education, scholars and district consultants in the sciences, and teachers. The three programs varied considerably in structure, with the Elementary Science Study being the most open ended and *Science: A Process Approach* being the most structured. None were structured around textbooks in elementary science. Students acquired data largely through observation and experimentation. Among the three programs, there were 57 controlled studies reported over a five-year period, involving 900 classrooms and, conservatively, about 13,000 students. Two-thirds of the studies involved ten or more classrooms. Half of the studies were a year or more long, and most lasted two years or longer.

The mean effect size for learning science processes was 0.52. The effect size for scientific content was 0.16. Attitude toward science and process was 0.28. Smaller subsets examined effects on creativity (0.42) and measures of intelligence (0.48). Computation and mathematical understanding increased modestly. The aggregated mean effect size was 0.30 (Bredderman, 1983, p. 512).

Those curriculums emphasized the parent disciplines of the sciences, mathematics, social sciences, and literacy and emphasized teaching that used the collaborative inquiry processes that facilitated knowledge and skill attainment. In a real sense, the research tested the results of collaborative, inquiry-based curriculum and instruction.

The Second Phase of the Academic Reform Movement

Over the next 20 years, research on inquiry teaching continued, and in 2010, Minner, Levy, and Century presented a synthesis that included 138 studies from 1984 to 2002. Nearly 2000 classrooms and about 40,000 students were involved.

Like Anderson 27 years before them, Minner, Levy, and Century are able to make a definitive statement about the effectiveness of the inquiry-based science curriculum during what we characterize as the second phase of the Academic Reform Movement.

> Findings … indicate a clear, positive trend favoring inquiry-based instructional practices, particularly instruction that emphasizes students' active thinking and drawing conclusions from data. Teaching strategies that actively engage students in the learning process through scientific investigations are more likely to increase conceptual understanding than are strategies that rely on more passive techniques. (p. 474)

Generally speaking, the results from the Minner, Levy, and Century synthesis are somewhat larger than the results from the studies associated with the Academic Reform Movement. Probably this is a result of the increased refinements in curriculum and instruction—and we can expect more.

The Third Phase of the Academic Reform Movement

The National Academy of Science's *Framework for K-12 Science Education: Practices, Concepts, and Core Ideas* (National Research Council, 2012) provides the conceptual foundation for the next core curriculum in science and has generated a third phase of the Academic Reform Movement. The inclusion of engineering and technological content enhances content and process significantly. From the 60 years of studies drawn on previously, we can predict that not only the teaching/learning process will be upgraded, but that student learning will also rise.

The authors of the framework recommend even more powerful curricula than their predecessors. The Next Generation Science Standards (NGSS) were derived from the framework and designed to help teachers bring this curriculum to their K-12 students (National Research Council, 2013). The development of hybrid curricula that draw on information and communication technology (ICT) and the increased use of interactive electronic media in and out of school should increase the use of investigation as part of the curriculum. There is now ample evidence that the success of ICT in education will depend on the models of teaching and learning that are implemented.

STEM initiatives support and go beyond NGSS. The director of the National Science Foundation (NSF) began using the acronym for Science, Technology, Engineering, and Mathematics (STEM) in 2001. That same year, governors of seven states began securing extra funding for science and/or STEM education. In 2015, Congress passed the *STEM Education Act of 2015*, strengthening teacher training and adding computer science to the STEM curriculum. And the effort to improve instruction and student learning within and across these disciplines continues with the *Raise the Bar: STEM Excellence for All Students* (U.S. Department of Education, 2022).

The major themes of the first Academic Reform Movement are reiterated and expanded in the frameworks and initiatives described above. Again, the disciplines are emphasized (the documents—*Framework for K-12 Science Education*, *Next Generation Science Standards*, *Common Core State Standards in Mathematics and English Language Arts*—are courses in themselves), but applications to problem-solving, collaboration, and multidisciplinary instruction have a strong emphasis, as does attention to student agency and preparing students to successfully navigate the twenty-first century, multiple workplaces, and higher education.

The time between the research conducted during World War II and now generated many of the models of teaching introduced in the pages that follow.

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PART

I

Models of Teaching and Communities of Learners

We survey a selection of models of teaching, examine them as models of learning for students, and consider how to build communities of learners.

Chapter 1 opens our inquiry. We examine the concept of models of teaching and learning, and begin to study where these models have come from. In Chapter 2, we delve into the social aspects of learning, for effective learning in most classrooms involves the development of communities of learners. The models of teaching presented are selected not only by how well they help students achieve the specific objectives toward which they are directed (for example, social skill, information, ideas, self-esteem, creativity) but also by how well they increase the ability to learn, which is their fundamental purpose.

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CHAPTER

1

The Search for Effective Ways to Educate

Introducing the Models of Teaching

Effective teaching is made up of a toolkit of ways to reach students and help them build their reservoir of knowledge, skills, and enduring values.

The classic definition of teaching is creating environments to facilitate learning. A model of teaching is a way of building a nurturant and stimulating ecosystem within which the students learn by interacting with its components. Various models pull students into particular types of content (knowledge, values, skills) and increase their competence to grow in the personal, social, and academic domains.

We use models in many ways, ranging from planning and using lessons, units, and curricula, to designing instructional materials, including multimedia programs. This concept replaces the "gas station" image of education, where students drop by to be loaded with cognitive fuel. That rather obsolete picture of teaching emphasizes the time-honored picture of a person imparting knowledge or skill by talking, exhorting, and drilling students—taking them through their paces in a grinding fashion. Happily, there are models for designing and delivering good lectures, motivating students, and carrying out effective lessons. There are times when we need to use the traditional delivery or transmission modes, but when we do, we should use the best models available for designing learning experiences and always be aware of the purposes that any approach can and cannot fulfill.

The last few decades have generated a number of fresh ways to enhance learning environments that existed only in dreams when we were writing the first edition of *Models of Teaching*. Even then we were using film, video recording and playback, simulations, a dozen or so models of teaching, and a variety of other technologies both in our school and our teacher education programs. Those media are still important, but some are still underused in schools and universities. The best models of teaching in the earlier era are still effective today, along with some new ones, and all are enhanced by information and communication technology (ICT) and the available digital education tools that enable students to have access to more powerful sources of information for processing. We don't yet know the impact of AI on schools, but believe the innovations it generates will permeate classrooms more quickly than previous technology.

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The Search for a Professional Repertoire: Models of Teaching Emerged

We have been fortunate enough to study with many educators who have developed and tested a variety of approaches to education and have developed the literature from the 1960s to the present. We visit schools and classrooms and study current research on teaching and learning. We also study teaching in settings other than K-12 schools, such as therapies and training in industrial, military, and athletic settings.

We have found models of teaching in abundance. Some have broad applications, whereas others are designed for specific purposes. They range from simple, direct procedures that yield immediate results to complex strategies that students acquire gradually from patient and skillful instruction.

For *Models of Teaching*, we selected models that constitute a basic repertoire for schooling. With these models we can accomplish most of the common goals of schools—and at a high standard. In any school, students can achieve many goals that only outstanding students in outstanding schools once aspired to achieve. Using models in combination, we can design schools, curricula, units, and lessons. The selection includes many, but not all, of the major philosophical and psychological orientations toward teaching and learning. All have a solid theoretical basis—that is, their creators provide us with a rationale that explains why we expect them to achieve the goals for which they were designed. The selected models also have histories of extensive practice behind them: they have been refined through experience so that they can be used comfortably and efficiently in classrooms and other educational settings. Furthermore, they are adaptable to the learning styles of students and to the requirements of many curriculum areas. Education comes to curriculum standards with a well-stocked storehouse of effective models that address the most demanding standards.

In addition to being validated by experience, all are backed by formal research and disciplined action research that tests their theories and their abilities to yield positive effects. The amount of related research varies from model to model. Some are backed by a few studies; others have hundreds of items of research. As we discuss each model, we provide key references and links—ones that provide access to the research literature and will include page-long descriptions of some of the more revealing studies. They were designed to have positive effects on student learning, and we try to make the warrants (evidence and reasoned analysis) under their stated effects as transparent as possible.

We carried out development and research on various models and on methods for teaching them to teacher candidates and in-service teachers. At the same time Bruce and Fred Lighthall, capitalizing on studies of how people attain concepts and build them, developed a concept attainment model that turned the research into an instructionally useful configuration. From that research and the creation of print materials and video-taped demonstrations, we reached the point where it was possible to write the first edition of *Models of Teaching*.

Research on Models and Preparing Teachers to Use Them

During the years that followed, research was developed with three types of objectives applied to specific models.

- One was directed at engineering the model and learning if it could help students acquire the behaviors embedded in it.

- Two was determining whether it could have short-term effects on student learning related to very specific content.
- Three was whether, as part of a curriculum area or a school improvement effort, it would result in improving student learning in general.

For example, *synectics* is designed to teach students to create analogies. The first type of research objective on the model was to learn whether it enables students to do just that—to create analogies, particularly metaphors. The second type was whether the model can enable students to apply analogies to curriculum areas such as writing or use them to think conceptually about problems and complex dimensions in specific areas, such as using analogies to help generate ways of increasing job opportunities in the communities where the students live. The third type of research was whether, possibly in conjunction with other models, it can increase student learning in general, such as in the social studies or problem-solving in mathematics. In this type of study, the use of the model or models is compared with results from the "traditional" or normal mode in schools at the time when the research is conducted.

All models have been accompanied by the first type, assessing whether students can learn the basic skills, knowledge, or attitudes the model was designed for and can use them. All have examined whether students can transfer the model to increase learning in specific areas. And several have been tested in general curriculum or school improvement efforts. As each model is presented, we will inquire into the research that has accompanied its development.

Models of Teaching as an Educator's Basic Toolkit

No one way of teaching builds the skills of learning that embrace the whole of what needs to be learned. Taken together, however, several strong models help students build the complement of learning skills that enable them to fully educate themselves. Any given model builds part of the set of ways of learning that students need to develop fully in personal, social, and academic domains of inquiry. Each model pulls students into particular types of content (knowledge, values, skills, self-understanding) while increasing their competence to grow in the long term.

The Families of Models

We have grouped the models of teaching into four families whose members share orientations toward human beings and how they learn. These are:

- The Information-Processing Family
- The Social Family
- The Personal Family
- The Behavioral Systems Family

We turn now to these four families, what they emphasize, and the models and the people who invented them, studied them, and advocated for them. As you read, keep in mind that, as a teacher, you can begin with a few that have wide applicability and then add others to reach particular goals more readily.

The Information Processing Family

Basic Information-Processing Models (Part II)

Information-processing models emphasize ways of enhancing the human being's innate drive to make sense of the world by acquiring and organizing data, sensing problems and generating solutions to them, and developing concepts and language for conveying them. Some models help the learner find information and build concepts and hypotheses to test. Some emphasize teaching concepts directly. Some generate creative thinking. Others teach the processes of the disciplines that underlie the core subjects. All are designed to enhance general intellectual ability.

Seven information-processing models are discussed in Part II and III. Part II is focused on four broadly applicable models and Part III on more narrowly oriented "special purpose" models. Table 1.1 displays their names and the primary developers and redevelopers of each. In some cases, dozens of research-practitioners have contributed to the creation and renewal of particular approaches to teaching.

TABLE 1.1 Information-processing models

Model	Developer (Redeveloper)	Purpose
Inductive thinking* (Classification)	Hilda Taba (Bruce Joyce & many others)	Development of classification skills, hypothesis building and testing, and understanding of how to build conceptual understanding of content areas
Scientific inquiry*	Joseph Schwab and many others	Learning the research system of the academic disciplines—how knowledge is produced and organized
Concept attainment*	Jerome Bruner Fred Lighthall (Bruce Joyce)	Learning concepts and studying strategies for attaining and applying them; building and testing hypotheses
Picture word inductive model*	Emily Calhoun	Learning to read and write; inquiry into language
Synectics*	William Gordon	Help break set in problem solving and gain new perspectives on topic
Mnemonics*	Michael Pressley Joel Levin (and associated scholars)	Increase ability to acquire information, concepts, conceptual systems, and metacognitive control of information processing capability
Advance organizers*	David Ausubel (and many others)	Increase ability to absorb information and organize it, especially in learning from lectures and readings
Cognitive growth	Jean Piaget Irving Sigel Constance Kamii Edmund Sullivan	Increase general intellectual development and adjust instruction to facilitate intellectual growth

*Indicates a model that has a full chapter or section in this text

Inductive Thinking (Chapter 3)

The ability to analyze information and create concepts is generally regarded as the fundamental thinking skill. Although the model has been discussed since ancient times, the contemporary literature was given movement by the work of Hilda Taba (1966) and contemporaries who studied how to teach students to find and organize information and to build and test hypotheses. The model has been used in a wide variety of curriculum areas and with students of all ages—it is not confined to the sciences. Phonics and structural analysis depend on concept learning, as do rules of grammar. The structure of the field of literature is based on classification. The study of communities, nations, and history requires concept learning. Even if concept learning were not so critical in the development of thought, the organization of information is so fundamental to curriculum areas that inductive thinking would be a very important model for learning and teaching school subjects. The model as presented is based on the adaptations by Joyce and Calhoun (1996, 1998), and Joyce, Hrycauk, and Calhoun (2001) in programs designed to accelerate student ability to learn.

This model is listed first because inductive processes are such an important dimension of cognition and cognitive ability, because it leads easily to cooperative study and action, and because it combines well with other models.

Scientific Inquiry (Chapter 4)

The *Framework for K-12 Science Education: Practices, Concepts, and Core Ideas* and *Next Generation Science Standards* (National Research Council, 2012, 2013) are marvelous documents that set forth a forward-looking framework for K–12 science curriculum and teaching. The comprehensive scope and readable style of the *Framework* make it a fine resource for teachers of all grade levels and in all science areas. The inclusion of engineering and technology makes applied science more prominent than in the past and the "cross-cutting concepts" that look across the disciplines are an important contribution to science curriculum. The specificity of the *Next Generation Science Standards (NGSS)* describes student expectations and provides much guidance for teachers as they design instruction and work on implementation. However, much remains to be done in implementing the vision of the *Framework* and the student performances described in the *NGSS* (National Academies of Sciences, Engineering, and Medicine, 2022a). Scientific inquiry can accelerate this implementation and help teachers engage students in the practices that scientists employ as they investigate and build models and theories about the world.

Concept Attainment (Chapter 5)

Originally built around studies conducted by Bruner, Goodnow, and Austin (1967), and adapted and applied to education by Lighthall, Joyce, and others, concept attainment is a close relative of the inductive model. Whereas the inductive process calls on students to form concepts, concept analysis leads the students to attain concepts developed by others. The teacher develops a data set containing exemplars of a concept and items where the attributes of the concept are not present. The students then study pairs of contrasting items until they are clear about the concept. The model is an efficient method for presenting organized information from a wide range of topics to students at every stage of development and also enables students to become more effective at concept formation.

The Picture Word Inductive Model (PWIM) (Chapter 6)

Developed by Emily Calhoun (1999), this model was designed from research on how students acquire print literacy, particularly reading and writing, but also how listening–speaking vocabularies are developed. PWIM incorporates the inductive thinking and concept attainment models as students study words, sentences, and paragraphs. The model is the core of some very effective curricula where kindergarten and primary students learned to read and older beginning readers and writers were engaged in "safety net" programs for upper elementary, middle school, and high school students (see Joyce, Calhoun, Jutras, & Newlove, 2006; and Joyce & Calhoun, 2010, 2012). ICT provides access to enormous reservoirs of pictures that can be used in PWIM and support for investigations initiated with the model.

Special Purpose Information-Processing Models (Part III)

All the basic models teach us ways of learning. These special-purpose models enhance particular capacities. Synectics teaches how to build and use analogies to express ourselves and solve problems. Mnemonics teaches ways of learning for the long-term, and how, as teachers, to teach so that content and skills are retained. The Advance Organizer shows us how to structure presentations, from talks to movies and simulations, so that the message is clear and the facts stick with our students.

Synectics (Chapter 7)

Developed first for use with "creativity groups" in industrial settings, synectics was adapted by William Gordon (1961) for use in elementary and secondary education. Synectics is designed to help people "break set" in problem-solving and writing activities and to gain new perspectives on topics from a wide range of fields. In the classroom it is introduced to students in a series of sessions until they can apply the procedures individually and in cooperative groups. Although designed as a direct stimulus to creative thought, synectics has the side effect of promoting collaborative work and study skills and a feeling of camaraderie among students. Studies and development by Keyes (2006) and Glynn (1994, 2015) have pushed the model a welcome new distance.

Mnemonics and Memorization (Chapter 8)

Mnemonics are strategies for memorizing and assimilating information. Teachers can use mnemonics to guide their presentations of material (teaching in such a way that students can easily absorb the information), and they can teach devices that students can use to enhance their individual and cooperative study of information and concepts. This model also has been tested over many curriculum areas and with students of many ages and characteristics. We include variations developed by Pressley, Levin, and Delaney (1982); Levin and Levin (1990); and popular applications by Lorayne and Lucas (1974) and Lucas (2001). Because memorization is sometimes confused with repetitious, rote learning of obscure or arcane terms and trivial information, people sometimes assume that mnemonics deal only with the lowest level of information. That is by no means true. Mnemonics can be used to help people master complex concepts, and in addition they can be a great deal of fun.

Advance Organizers (Chapter 9)

During the last 60 years this model, formulated by David Ausubel (1963), has accumulated a good-sized body of research. The model is designed to provide students with a cognitive structure for comprehending material presented through lectures, readings, and other media. It has been employed with almost every conceivable content and with students of every age. It can be easily combined with other models, for example, when presentations are mixed with inductive activity.

Table 1.1 displays the information processing models and their inventors.

The Social Family

When we work together, we generate a collective energy called *synergy*. The social models of teaching are constructed to take advantage of this phenomenon by building learning communities. Essentially, classroom management is a matter of developing cooperative relationships in the classroom. The development of positive school cultures is a process of developing integrative and productive ways of interacting and norms that support vigorous learning activity. Our selections for the social family of models includes Partners in Learning for cooperative learning, Group Investigation for collaboratively solving problems and building projects, and role playing for the study of values.

Partners in Learning (Chapter 10)

There has been a great deal of development work on cooperative learning and developing strategies that help students work effectively together. The contributions of three teams—led respectively by Roger and David Johnson, Robert Slavin, and Shlomo Sharan—have been particularly notable, but the entire cooperative learning community has been active in exchanging information and techniques and in conducting and analyzing research. The result is a large number of effective means of organizing students to work together. These range from teaching students to carry out simple learning tasks in pairs to complex models for organizing classes and even organizing whole schools into learning communities.

Cooperative learning procedures can facilitate learning across all curriculum areas, ages, and academic learning goals, as well as improve self-esteem, social skills, and solidarity. Constructive controversy, a form of cooperative learning, can improve decision making, discourse when there are conflicting views, and creativity. And as Johnson and Johnson (2018/2019, Ch. 5, p. 59) remind us, it "is the foundation on which many of the active learning procedures are based."

Group Investigation (Chapter 11)

John Dewey (1916) was the major spokesperson for the idea—extended and refined by a great many teachers and shaped into a powerful definition by Herbert Thelen (1960)—that education in a democratic society should teach the democratic process directly. A substantial part of students' education should be through cooperative inquiry into important social and academic problems. The model also provides a social organization within which many other models can be used when appropriate. Group investigation has been used in all subject areas, with children of all ages, and even as the core social model for entire schools (Chamberlin & Chamberlin, 1943; Joyce, Calhoun, & Hopkins, 1999).

Group Investigation requires advanced cooperation as students seek to answer difficult questions and try to solve puzzling situations and problems. The model is designed to lead students to clarify questions/define problems, explore various perspectives, and study together to master information, ideas, and skills—simultaneously developing their social competence. The teacher or facilitator organizes the group process and disciplines it, helps the students find and organize information, and ensures that there is a vigorous level of activity and discourse. Sharan and Shachar (1988) and Joyce and Calhoun (1998) have extended the model and combined it with findings on the development of inquiring groups. It can also function as the social framework for project-based and problem-based learning.

Role Playing (Chapter 12)

Role playing is included next because it leads students to understand social behavior, their role in social interactions, and ways of solving problems more effectively. Designed by Fannie and George Shaftel (1982) specifically to help students study their social values and reflect on them, role playing also helps students collect and organize information about social issues, develop empathy with others, and attempt to improve their social skills. In addition, the model asks students to "act out" conflicts, learn to take the roles of others, and observe social behavior. It is an excellent model for use with restorative practices, and with appropriate adaptation, role playing can be used with students of all ages.

Table 1.2 identifies the models and several of the developers of the social models.

TABLE 1.2 Social models

Model	Developer	Purpose
Partners in Learning*	David Johnson Roger Johnson Elizabeth Cohen	Development of interdependent strategies of social interaction; understanding of self–other relationships and emotions
Structured social inquiry	Robert Slavin and colleagues	Academic inquiry and social and personal development; cooperative strategies for approaching academic study
Group investigation*	John Dewey Herbert Thelen Shlomo Sharan Rachel Hertz-Lazarowitz	Development of skills for participation in democratic process; simultaneously emphasizes social development, academic skills, and personal understanding
Social inquiry	Byron Massialas Benjamin Cox	Social problem solving through collective academic study and logical reasoning
Laboratory method	National Training Laboratory (many contributors)	Understanding of group dynamics, leadership, understanding of personal styles
Role playing*	Fannie Shaftel George Shaftel	Study of values and their role in social interaction; personal understanding of values and behavior
Jurisprudential inquiry	James Shaver Donald Oliver	Analysis of policy issues through a jurisprudential framework; collection of data, analysis of value questions and positions, study of personal beliefs

* Indicates a model that has a full chapter or section in this text

The Personal Family

Ultimately, human reality resides in our individual consciousnesses. We develop unique personalities and see the world from perspectives that are the products of our experiences and positions. Common understandings are a product of the negotiation of individuals who must live and work and create families together.

The personal models of learning begin from the perspective of the selfhood of the individual. They attempt to shape education so that we come to understand ourselves better, take responsibility for our education, and learn to reach beyond our current development to become stronger, more sensitive, and more creative in our search for high-quality lives. The cluster of personal models pays great attention to the individual perspective and seeks to encourage productive independence, so that people become increasingly self-aware and responsible for their own destinies.

Nondirective Teaching (Chapter 13)

Nondirective Teaching is the key to personalized learning, as the teacher works to lead students to understand themselves as they learn. Working non-directly requires tremendous energy

The model is used in several ways. First, at the most general (and least common) level, it is used as the basic model for the operation of entire educational programs (Neill, 1960). Second, it is used in combination with other models to ensure that contact is made with the students. In this role, it moderates the educational environment. Third, it is used when students are planning independent and cooperative study projects. Fourth, it is used periodically when counseling students, finding out what they are thinking and feeling, and helping them understand what they are about. Although designed to promote self-understanding and independence, it has fared well as a contributor to a wide range of academic objectives. Cornelius-White's (2007) review of many years of research on learner-centered, teacher–student relationships—119 studies involving more than 300,000 students—examined the impact on cognitive, affective, and behavioral outcomes and reported positive effects and, importantly, that for applications where academic content was included, gains in content were correlated with gains in affect, including self-concepts.

Inquiry Training (Chapter 14)

The inquiry training model was developed by Richard Suchman (1961) to teach students a process for investigating and explaining unusual phenomena. Suchman's model takes students through miniature versions of the kinds of procedures that scholars use to organize knowledge and generate principles. Based on a conception of the scientific method, it attempts to teach students some of the skills, habits, and language of scholarly inquiry.

One premise of the model is that a student's desire to know will lead to engagement with the content. Along with improving students questioning and analytical skills and their capacity to construct knowledge in the content being studied, another objective of the model was for students to transfer these skills or ways of learning to other areas of their lives, in and out of school, for academic and personal issues.

Table 1.3 displays some of these models and their developers.

TABLE 1.3 Personal models

Model	Developer	Purpose
Nondirective teaching*	Carl Rogers	Building capacity for personal development, self-understanding, autonomy, and self-esteem
Inquiry training*	Richard Suchman	Building basic inquiry skills and developing the capacity to construct knowledge and modify it based on new information
Positive self-concepts*	Abraham Maslow	Development of personal understanding and capacity for development
Awareness training	Fritz Perls	Increasing self-understanding, self-esteem, and capacity for exploration; development of interpersonal sensitivity and empathy
Classroom meeting	William Glasser	Development of self-understanding and responsibility to self and others
Conceptual systems	David Hunt	Increasing personal complexity and flexibility in processing information and interacting with others

*Indicates a model that has a full chapter or section in this text

The Behavioral Systems Family

A common theoretical base—most commonly called *social learning theory*, but also known as *behavior modification*, *behavior therapy*, and *cybernetics*—guides the design of the models in this family. The stance taken is that human beings are self-correcting communication systems that modify behavior in response to information about how successfully tasks are navigated. For example, imagine a human being who is climbing (the task) an unfamiliar staircase in the dark. The first few steps are tentative as the foot reaches for the treads. If the stride is too high, feedback is received as the foot encounters air and has to descend to make contact with the surface. If a step is too low, feedback results as the foot hits the riser. Gradually, behavior is adjusted in accordance with the feedback until progress up the stairs is relatively comfortable.

Capitalizing on knowledge about how people respond to tasks and feedback, psychologists (see especially Skinner, 1953) learned how to organize task and feedback structures to make it easy for human beings' self-correcting capability to function. The result includes programs for reducing phobias, learning to read and compute, developing social and athletic skills, replacing anxiety with relaxation, and learning the complexes of intellectual, social, and physical skills necessary to pilot an airplane or a space shuttle. Because these models concentrate on observable behavior and clearly defined tasks and methods for communicating progress to the student, this family of teaching models has a firm research foundation. The behavioral models have been widely used in programmed instruction and online courses. Behavioral techniques are appropriate for learners of all ages and for an impressive range of educational goals.

Using Explicit Instruction and Metacognition When Teaching Reading Comprehension (Chapter 15)

Here we begin with the explicit teaching of reading comprehension strategies. Although reading without comprehension is not really reading, the explicit teaching and mental modeling of comprehension has not been common in schools. However, research and development, practice, and results have given us a serviceable model.

Every teacher will find this model useful, although many find that their initial attempts at sharing their thinking as they comprehend is challenging.

Mastery Learning (Chapter 16)

The most common application of behavioral systems theory for academic goals takes the form of what is called mastery learning (Bloom, 1971). First, material to be learned is divided into sections ranging from the simple to the complex. The material is presented to the students, generally working as individuals, through appropriate media (readings, video clips, activities). Piece by piece, the students work their way successively through the units of materials, after each of which they take a test designed to help them find out what they have learned. If they have not mastered any given unit, they can repeat it or an equivalent version until they have mastered the material.

Instructional systems based on this model have been used to provide instruction to students of all ages in areas ranging from the basic skills to highly complex material in the academic disciplines. With appropriate adaptation, they have also been used with gifted and talented students, students with emotional problems, and athletes and astronauts.

Direct Instruction (Chapter 17)

From studies of the differences between more and less effective teachers and from social learning theory, a paradigm for instructing directly has been assembled. Direct statements of objectives, sets of activities clearly related to the objectives, careful monitoring of progress, feedback about achievement, and tactics for achieving more effectively are linked with sets of guidelines for facilitating learning. Two approaches to training have been developed from the cybernetic group of behavior theorists. One is a theory-to-practice model and the other is simulation. The focus here is on the theory-to-practice model, which mixes information about a skill with demonstrations, practice, feedback, and coaching until the skill is mastered. For example, if an arithmetic skill is the objective, it is explained and demonstrated, practice is given with corrective feedback, and the student is asked to apply it with coaching from peers or the instructor. This variation is also commonly used for athletic training.

Table 1.4 displays the models and their developers.

Common Characteristics Across All Models

Learning is the reason for all models, but other attributes are common and integral to the teaching stances represented by the models. Here are some of the characteristics that all of the selected models share.

Helping Students Learn How to Learn

In their own fashion, each of the models include helping students increase their repertoire of strategies for learning. While using any model, teachers study how the students learn and help them expand their capacity to do so.

- **Helping students take responsibility for learning and supporting their efforts**. Even when being highly directive, which can be the case while introducing students to new ways of learning, we emphasize that they need to build the

TABLE 1.4 Behavioral models

Model	Developer	Purpose
Social learning	Albert Bandura Carl Thoresen Wes Becker	The management of behavior: learning new patterns of behavior, reducing phobic and other dysfunctional patterns, learning self-control
Explicit instruction and metacognition*	P. David Pearson & Margaret Gallagher Ruth Garner Gerald Duffy Laura Roehler and others	Learning to be a strategic reader
Mastery learning*	Benjamin Bloom James Block	Mastery of academic skills and content of all types
Programmed learning	B. F. Skinner	Mastery of skills, concepts, factual information
Direct instruction*	Thomas Good Jere Brophy Wes Becker Siegfried Englemann Carl Bereiter	Mastery of academic content and skills in a wide range of areas of study
Simulation	Carl Smith & Mary Foltz Smith provided guidance through 1960s when design had matured Harold Guetzkow Many developers	Mastery of complex skills and concepts in a wide range of areas of study
Anxiety reduction	David Rinn Joseph Wolpe John Masters	Control over aversive reactions; applications in treatment and self-treatment of avoidance and dysfunctional patterns of response

* Indicates a model that has a full chapter or section in this text

capacity to take increasing responsibility for their learning. We move from a need to provide extensive coaching to students to a situation where students are coaching themselves.

- **Helping students reach toward new knowledge, skills, and self-understanding**. The essence of learning, in school and out, is acquiring new cognitions, abilities, and even emotions and values. A major part of teaching is helping students learn to go beyond where they are. When a six-year-old says, "I don't like to read!" the underlying emotion is that the child wants to avoid the labor of learning to read and, possibly, the feeling of embarrassment while overcoming difficulties in learning.

A Constructivist Orientation

In their own fashions, all these models seek to help students build knowledge, skills, and values. The instructional aims of several models are almost purely constructivist with respect to academic content (see Vygotsky, 1986). For example, inductive inquiry (Chapter 3) designs the environment so that the student constructs categories, tests them, and from them generates inferences and hypotheses, leading to more testing. A very

different model, nondirective teaching (Chapter 13), is designed to help students understand themselves better—to construct self-knowledge—and set goals in the personal, social, and academic domains.

Scaffolding the Learning Process

Built into their processes, all the selected models provide avenues for teachers to "boost" students over difficulties and into the next levels of learning. Vygotsky described the process as seeking the "zone of proximal development" where learning tasks are at a level slightly above the student's zone of complete comfort, but not so far above that the student cannot manage. Conceptual systems theorists, including the present authors, describe this as providing an "optimal mismatch" designed to enable students to pull themselves into ever-higher levels of capability (see Chapter 18). For example, when teaching new skills with direct instruction models (as in Chapter 17), a skill is explained and demonstrated and then the student has to try the skill. At that point, if a student shies away, scaffolding in the form of encouragement may be enough to lift them to try. Possibly more explanation or another demonstration may be in order, but providing motivation may be the difference between success and discouragement. Scaffolding by a teacher can be a critical support when a student is engaged in distance learning, such as taking part or all of a course online. More than ever, students need to learn to profit from distance offerings. Even those who are highly skilled at downloading and learning to play games may need help when downloading, organizing, and using large quantities of information.

Formative Assessment and Adjustments

Closely related to scaffolding is the use of formative assessment to determine whether more or a different kind of support is needed to help a student make progress. ICT is an increasingly important resource for classes as a whole, as well as providing acceleration for students who are sprinting ahead and tutoring for those who need extra help along the way. Helping students become aware of their progress and needs is a critical component of formative assessment. Parents are also brought into the process when they can help, which is frequently. All models of teaching provide the opportunity for teachers and students to study progress, continue things that are working well, and make adjustments by adding processes and replacing ones that are not working.

Twenty-First-Century Skills

We continue to focus on what is termed twenty-first-century skills—types of expertise that have come to the fore as the global, multicultural, and digital worlds continue to expand. Some twenty-first-century skills are versions of competence that have been around for a while. Some have been emphasized in current literacy, science, and social studies standards, and some are emerging as digital technology and artificial intelligence expand. They are not just a collection of technology or ICT skills. Though ICT literacy is important, the vital skills are cognitive: learning to question, to inquire, to build and test ideas, to categorize, to summarize and synthesize, to argue with evidence, to understand the perspectives of others. These have been with us a long time, and they continue to be essential, more so now than when we wrote the last edition of

Models of Teaching. However, while everyone *may* not need coding, everyone needs the skills for searching the web and analyzing the veracity of sources; for locating and using distance instruction; for using software for word processing, graphics, photo and video editing; for organizing and manipulating data; and for communicating digitally in multiple modes, whether it's mini-documentaries, podcasts, photo essays, etc.

Cultural Literacy and Global Awareness

One of the most striking characteristics of today's digital world is the rise of a global, cross-national culture and its effects on relations near and far, including our classrooms and our neighborhoods and our homes. These effects change the nature of our society, increase interdependence, and generate a considerable need for intercultural understanding. The implications are apparent as nations and their well-being have become more interdependent, economies more connected; and we as individuals are in contact with, well, almost everyone instantly. A provincial perspective today can have devastating consequences.

Collaborative and Cooperative Skills

We need each other. We always have, but the price of failure to work with others near and far has become unsustainable. Schools need to develop a rich culture to teach students to work and play together, to disagree and argue peacefully, and to reach consensus or compromise when needed. In fact, the campus is such an important place because it is the major social laboratory for the young. As they reach out into cyberspace and information and ideas zip back from global sites, students need each other and caring/competent adults for perspective. The simpler cooperative learning models need to pervade the school, and the most complex models—cooperative/inquiry models and group investigation—should propel major inquiries, including those launched by student questions and concerns.

The models in this book share these characteristics and goals.

In Sum

The models briefly introduced here have been selected from many other possibilities. We are sure these can be used in classrooms and in cyberspace. Their effectiveness has been substantiated by experience and formal research. As we will see later, achieving mastery over them takes practice. Teams of teachers working together to master a model can share reflections and companionship as one progresses from being a novice to achieving executive control over that model.

Trying to do our best fits with the challenge offered by the developer of the car, the Mustang, that is still with us almost 60 years later:

> In a completely rational society … the best of us would aspire to be teachers and the rest of us would have to settle for something less, because passing civilization along from one generation to the next ought to be the highest honor and the highest responsibility anyone could have.
>
> (Iacocca, 2007, p. 17)

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